

A NEW FAMILY OF PALAEOZOIC OSTRACODS

by M. N. GRAMM

ABSTRACT. The family Egorovitinidae is erected for *Egorovitina kirssanovi* gen. et. sp. nov. a new ostracod with an unusual adductor muscle scar, from the Lower Carboniferous (Visean) deposits of the Novgorod region, U.S.S.R. The presence of a simple calcified inner lamella may indicate that this new family has affinities with the Podocopina.

IN the Lower Carboniferous, Viséan strata (Alexinsky horizon) of Novgorod region (Borovitchi district) some carapaces and valves of a new ostracod species *Egorovitina kirssanovi* gen. et sp. nov. have been found.

The adductor muscle scar is of an extraordinary pattern (text-fig. 1). It resembles a five-toed footprint consisting of a postero-median or postero-ventral spot with five elongate anterior spots arranged in a pedate pattern.

The discovery of this structure increases the number of Palaeozoic ostracod groups whose adductor muscle-scar patterns were highly ordered. Previously this has been demonstrated on *Scrobicula scrobiculata* (Jones, Kirkby and Brady) (see Gramm and Posner 1972). It shows that the adductor muscle-scar patterns of Palaeozoic ostracods do not in all cases consist of an irregular cluster of randomly arranged spots.

On account of this unusual adductor muscle-scar pattern the new family, Egorovitinidae, is erected. The ordinal position of the new family is unclear. It is doubtful whether at present the problem can be solved by means of the adductor muscle scar. The adductor pattern shows that Egorovitinidae fam. nov. cannot be included in the suborders Platycopa and Metacopa, or amalgamated with the known families of Podocopa. Contrary to this a quite indefinite position exists about the interrelation with Palaeocopida (= Beyrichiida), because the scarcity of the adductor muscle-scar data prevents any comparison. At the same time propinquity to the Palaeocopida (= Beyrichiida) should be excluded on the basis of the carapaces outlines, straight (not convex) ventral margin, and surface without sulcation and lobation of the new family.

A very important criterion is the calcified inner lamella. In the material studied it is of primitive type resembling that in *Scrobicula* and *Roundyella* (Gramm 1976), i.e. thin, narrow, and of a uniform width along the entire free margin. According to this structure the family is tentatively attributed to the suborder Podocopina.

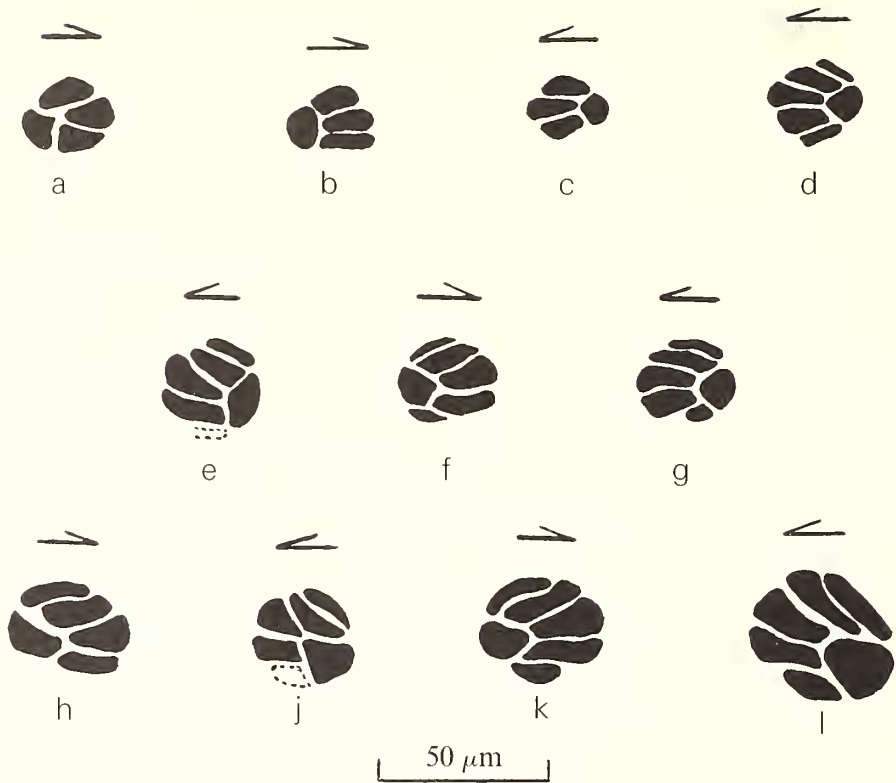
All specimens referred to in the text under Nos. 1116 and 1126 have been deposited in the Institute of Biology and Pedology, Far-East Scientific Centre, U.S.S.R. Academy of Sciences, Vladivostok.

SYSTEMATIC DESCRIPTION

Suborder ?PODOCOPINA Sars, 1866

Family EGOROVITINIDAE Gramm, fam. nov.

Diagnosis. Carapace elongate, subrectangular, with ridge-like swellings along both extremities. The circular adductor muscle scar consists of a postero-median or



TEXT-FIG. 1. Adductor muscle scars of different growth stages of *Egorovitina kirssanovi* gen. et sp. nov. from the Lower Carboniferous, Viséan, Alexinsky horizon, Borovitchi district, Novgorod region, U.S.S.R. *a*, right valve external view, 1126/9-3 (L = 275 μ m). *b*, right valve external view, 1126/10-1 (L = 275 μ m). *c*, left valve external view, 1126/10-2 (L = 285 μ m). *d*, right valve internal view, 1126/1-4 (L = 325 μ m). *e*, left valve external view, 1126/9-2 (L = 325 μ m). *f*, right valve external view, 1126/10-3 (L = 330 μ m). *g*, left valve external view, 1126/10-4 (L = 330 μ m). *h*, left valve internal view, 1126/1-2 (L = 360 μ m). *j*, right valve internal view, 1126/7-2 (L = 385 μ m). *k*, left valve internal view, 1126/1-1 (L = 400 μ m). *l*, right valve internal view, 1116/124 (L = 475 μ m). L—length of valve. Arrows indicate anterior.

postero-ventral spot with five elongate anterior spots, of which the three middle are the longest. Calcified inner lamella of primitive type.

Assigned genera. *Egorovitina* gen. nov. from the Lower Carboniferous deposits of Novgorod region.

Remarks. See generic description.

Genus EGOROVITINA nov.

Derivation of name. In honour of Dr. G. I. Egorov, a student of Palaeozoic ostracods from the North-Western regions of the U.S.S.R.

Type species. *Egorovitina kirssanovi* sp. nov.

Diagnosis. Carapace small, elongate, thin-walled, subrectangular in outline. The left valve is larger. Both extremities broadly rounded, the posterior higher than the anterior. Dorsal margin straight, ventral nearly parallel to it. Along the extremities are ridge-like swellings (rims); in the antero-ventral/postero-dorsal parts of the right valve, and in the postero-ventral/antero-dorsal parts of the left valve these form prominent elongate knobs. Surface with shallow smoothed pits. Hinge adont. Inner calcified lamella thin, narrow and of uniform width, with a contact groove on the left valve. Radial pore canals not observed. Normal pore canals very thin, numerous. The adductor muscle-scar pattern as for the family.

Assigned species. Only the type species.

Remarks. The outline of the new genus resembles *Roundyella* Bradfield, 1935. However, the latter has no rims on the end margins. *Roundyella* also differs from *Egorovitina* in that the surface is covered with rather numerous thin spines, and in the adductor muscle-scar pattern.

The new genus resembles *Bideirella* Stover, 1956 (Middle Devonian of North America; Stover 1956, p. 1137, pl. 119, figs. 7-10; Moore 1961, p. 169, fig. 104. 1) still more, but *Bideirella* has a strongly pitted surface, acute ends in dorsal aspect and the vertical ridges near ends, which extend '... the full height of the valve' and have no knobs, are not similar to the rims of *Egorovitina*.

There is also a certain similarity with *Parenthatia* Kay, 1940 (middle Ordovician of North America; Kay 1940, p. 359, pl. 32, figs. 43-46; Moore 1961, p. 129, fig. 62. 10, 11). The distinctions are in differently rounded extremities in *Parenthatia* and presence of a shallow transverse depression; besides that the marginal elevations, which resemble the ridge-like swellings of *Egorovitina*, are acuminate and crest-like in form.

As compared to *Moorites* Coryell and Billings, 1932, which has somewhat similar outline and rims on its ends, the new genus differs in the following characteristics: (1) both ends are evenly rounded; in *Moorites* the anterior is obliquely rounded (Coryell and Billings 1932, pl. 18, figs. 5-7; Bushmina 1968, pl. 6, figs. 1-8, 14); (2) cardinal angles indistinct; in *Moorites* they are clearly expressed (ibid.); (3) ventral margin straight; in *Moorites* it is often concave (ibid.); (4) surface with shallow, rather evenly distributed pits; in *Moorites* there are coarse pits, situated in elongate depressions between rims (Coryell and Billings 1932; Sohn in Moore 1961, fig. 115. 3a, 3e), or furrows (Bushmina 1968, pl. 6, figs. 5-8); (5) hinge adont with a groove on the left valve; in *Moorites* there are vertical teeth and sockets (Sohn in Moore 1961, fig. 115. 3d). The adductor muscle-scar patterns differ sharply. Scott gave the first description and schematic illustration of *Moorites* adductor muscle scar (Scott 1944, p. 171, fig. 22). The structure comprises three rounded spots, two at top, and one at base. It should be noted that Scott had in his possession moulds and it is not certain that the described adductor muscle scar belongs to *Moorites*, and not to *Youngiella* Jones and Kirkby, 1895. Scott's figure is mentioned as *M. minutus* (Warthin) in the plate description, but in the text (p. 171) it is referred to as *M. convergens* (Bradfield), a species, which has been questionably referred by Bradfield (1935, p. 72, pl. 4, fig. 16) to *Youngiella*. The validity of *Moorites* has been called in question by some authors (Wilson 1933; Posner 1951) who believed it to

be a younger synonym of *Youngiella*. In any case the propinquity of both genera is indubitable and it is reasonable to consider the adductor muscle scar described by Scott as characteristic for the family Youngiellidae Kellet, 1933. A micrograph of the adductor muscle scar of *Y. naviculata* Posner, 1951, obtained by me, confirms Scott's data; the pattern consists of three round spots adjacent to each other.

Egorovitina differs also from *Moorites* and *Youngiella* in the free margin structure. According to my observations *Youngiella* possesses a calcified inner lamella and radial pore canals. It is noteworthy that Bradfield (1935, pp. 70, 74) mentioned that representatives of Youngiellidae may really belong with the Cytheridae; and Posner (1951, p. 71) indicated the presence of a pore-canal zone. In *Egorovitina* radial pore canals not observed.

The above facts show that *Egorovitina* gen. nov. and *Moorites* are distinct and should be classified into quite different families.

Egorovitina kirssanovi sp. nov.

Plate 52, figs. 1-16

Derivation of name. In honour of Mr. V. K. Kirssanov.

Type material. Holotype: Carapace, 1126/12-2. Paratypes: Four complete carapaces (1116/125, 1116/144-1, 1116/159, 1116/144-2), twelve left valves (1126/1-1, 2, 1126/2-1, 1126/3-1, 2, 3, 1126/8-2, 1126/9-1, 2, 1126/10-2, 4, 1126/26), and eight right valves (1126/1-4, 1126/2-2, 1126/7-2, 1126/8-1, 1126/9-3, 1126/10-1, 3, 1126/13-1). All types are from Viséan Stage (Alexinsky horizon), Borovitchi district, Novgorod, U.S.S.R.

Other material. Four carapaces and over twenty-five valves.

Diagnosis. Carapace small, in form close to a rectangular parallelepiped. The left valve is the larger. Extremities broadly rounded; the anterior is lower. Surface with shallow pits. Along both extremities ridge-like swellings with diagonal and oppositely placed elongate knobs present. Internal feature as for the genus and family.

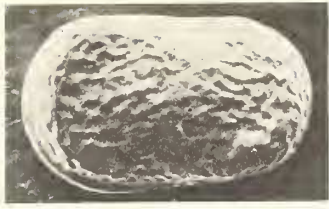
Description. Carapace small, up to 560 μ m, thin-walled, in form close to a rectangular parallelepiped. Left valve slightly overlaps right valve along the entire free margin. In dorsal view with equally truncated ends, and nearly parallel sides. Venter flattened.

In lateral view subrectangular, anterior and posterior margins evenly and broadly rounded; the former is lower. Dorsal margin straight, merging with anterior and

EXPLANATION OF PLATE 52

Figs. 1-16. *Egorovitina kirssanovi* sp. nov. Lower Carboniferous, Viséan, Alexinsky horizon, Borovitchi district, Novgorod region, U.S.S.R. 1-3, holotype, carapace, 1126/12-2. 1, right view, $\times 74$; 2, dorsal oblique, left side, $\times 72$; 3, dorsal, $\times 74$. 4, right valve, 1126/13-1, external view, $\times 78$. 5, left valve, 1126/26, internal view, $\times 76$. 6, right valve, 1126/10-1, adductor muscle scar, external view, $\times 150$. 7, 11, left valve, 1126/10-2. 7, external view, $\times 150$; 11, adductor muscle scar, external view, $\times 460$. 8, 15, left valve, 1126/1-1. 8, internal view, $\times 150$; 15, adductor muscle scar, internal view, $\times 460$. 9, 16, right valve, 1116/124. 9, external view, $\times 85$; 16, adductor muscle scar, internal view, $\times 460$. 10, right valve, 1126/9-3, adductor muscle scar, external view, $\times 460$. 12, left valve, 1126/9-2, adductor muscle scar, external view, $\times 460$. 13, left valve, 1126/1-2, adductor muscle scar, internal view, $\times 460$. 14, left valve, 1126/3-3, adductor muscle scar, external view, $\times 460$.

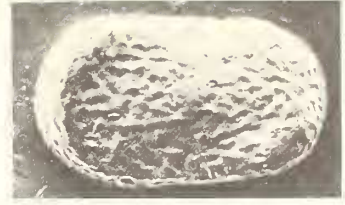
Figs. 1-5. Scanning electron micrographs (Cambridge Instruments 'Stereoscan 600', A1 coating); figs. 6-16 transmitted light.



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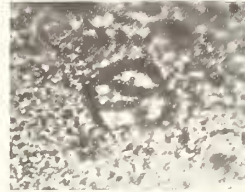
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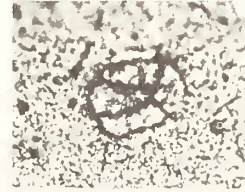
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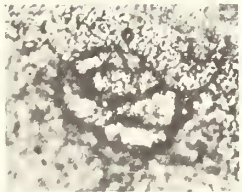
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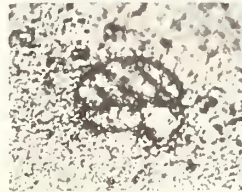
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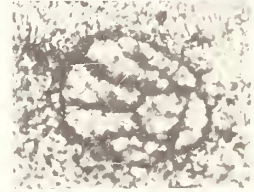
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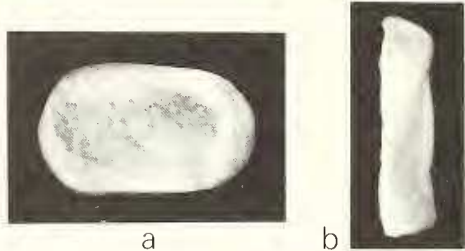


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GRAMM, *Egorovitia kirssanovi* sp. nov.

posterior margins via obtuse cardinal angles. Ventral margin nearly parallel to dorsal and fluently curving merges with the ends.

Surface uniformly covered with shallow, smooth, and barely discernible pits. Fairly broad ridge-like swellings (rims) present along both extremities, limited proximally by gentle crescentic depressions.



TEXT-FIG. 2. *Egorovitina kirssanovi* sp. nov. Right valve, 1116/124: a, external view; b, dorsal view, $\times 60$. Reflected light photographs. Lower Carboniferous, Viséan, Alexinsky horizon; Borovitchi district, Novgorod region, U.S.S.R.

On right valve, at anterior cardinal angle, the swelling is weakly expressed; gradually becoming stronger and acquiring a rim-like form it reaches maximum in the antero-ventral part, where it forms a prominent elongate knob. On the posterior margin the rim is clearly distinguishable and reaches a maximum at the postero-dorsal cardinal angle as a prominent elongate knob. On the left valve the rims are developed more evenly and the maxima (elongated knobs), situated in antero-dorsal and postero-ventral parts, are not so strongly expressed. Owing to diagonal and oppositely placed elongate knobs,

the carapace in dorsal or ventral views has an obliquely compressed appearance.

Hinge adont; hinge-margin straight, thin with a narrow groove in the left valve.

Calcified inner lamella thin, narrow, and of uniform width, with a contact groove on the left valve. Walls are pierced with numerous, very thin normal pore canals; the distance between canals 2-3 μm , diameter less than 1 μm .

The adductor muscle scar, roughly circular in form, is located in the mid-valve or slightly in front and higher. Internally it is situated on a round feebly expressed elevation. The structure is compact, round, resembling a five-toed footprint. In the posterior or postero-ventral part there is a supporting spot, away from which five elongate spots are arranged in a pedate pattern. The uppermost is thin, elongate; the three middle spots are the longest, well developed, and spatulate anteriorly; the lowermost spot is usually short and relatively thick. In juvenile forms the upper and lower spots are often indistinct.

Mandibular and frontal spots not observed.

		Length (μm)	Height (μm)	Width (μm)
Carapace holotype	1126/12-2	525	310	225
Left valve	1126/3-1	235	150	—
Right valve	1126/2-2	275	170	—
Right valve	1126/10-1	275	160	—
Right valve	1126/9-3	275	—	—
Left valve	1126/3-2	280	170	—
Left valve	1126/2-1	285	170	—
Left valve	1126/10-2	285	170	—
Left valve	1126/9-2	325	200	—
Right valve	1126/1-4	325	—	—
Right valve	1126/10-3	330	200	—
Left valve	1126/10-4	330	200	—

		Length (μm)	Height (μm)	Width (μm)
Left valve	1126/1-2	360	210	75
Right valve	1126/7-2	385	225	90
Left valve	1126/3-3	385	225	—
Left valve	1126/8-2	390	225	100
Left valve	1126/1-1	400	230	90
Left valve	1126/9-1	400	240	—
Right valve	1116/124	475	275	105
Right valve	1126/8-1	475	275	110
Right valve	1126/13-1	500	290	—
Left valve	1126/26	500	300	—
Carapace	1116/159	550	315	250
Carapace	1116/125	550	325	225
Carapace	1116/144-1	550	325	250
Carapace	1116/144-2	560	330	205

Ontogeny. In smallest specimens, 235–285 μm long, the anterior is higher than the posterior and the dorsal margin is slightly concave (Pl. 52, figs. 6, 7); the adductor muscle scar is slightly posterior of mid-valve length. In specimens 325–475 μm long both extremities are of equal height, dorsal margin straight, adductor muscle scar located in the middle of the valve. In carapaces 550–560 μm long the posterior extremity becomes the highest and the adductor pattern is slightly anterior of mid-valve length. Thus during the ontogeny the interrelation of the height of the anterior or posterior ends and the position of adductor pattern changes.

The adductor muscle scar undergoes the following changes: the smallest specimen studied (235 μm long) has the supporting spot and three anterior spots; this leads to a suggestion that these four spots appear first; the upper and the lower spots emerge later. During the ontogeny an increase in the adductor pattern and separate spots took place, the anterior spots (especially the middle ones) grew and lengthened most.

Variability. The ridge-like swellings are differently expressed on different specimens. The adductor pattern is also variable; this is seen on the illustrations and finds expression in the length and shape of separate spots. On the young growth-stages the number and shape of spots is also variable (Pl. 52, figs. 10–12). Notable are an adductor pattern with differently placed anterior spots (Pl. 52, fig. 14) and a pattern with an irregular posterior supporting spot (Pl. 52, fig. 13); apparently they are pathological phenomena.

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